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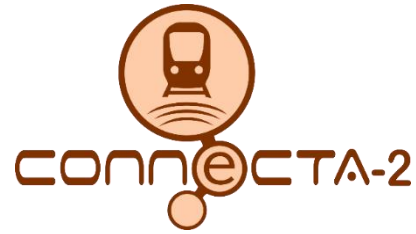

CONtributing to Shift2Rail's NExt generation of high Capable and safe TCMS. Phase 2

SAFE architecture for Robust distributed Application Integration in roLling Stock 2

WLTB Demonstrator

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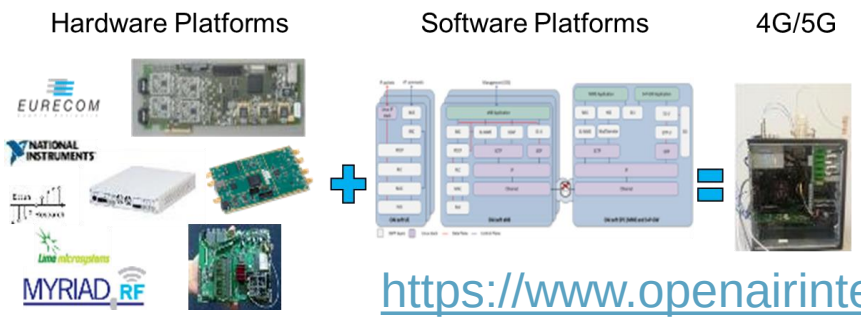
Technical Seminar on Advanced Architectures and Components for Next-Generation TCMS

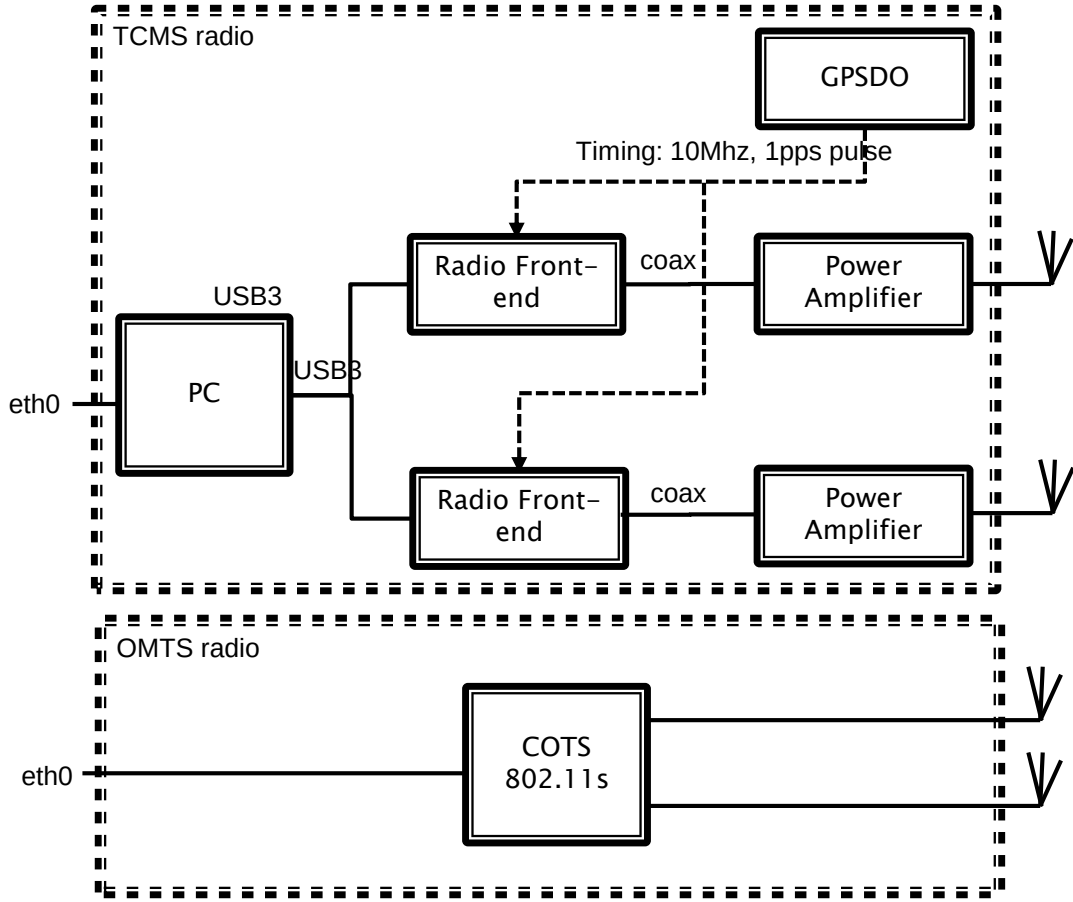
January 21st 2020, Brussels

Prototyping of WLTB: Radio Device

- WLTB Radio device specification for TCMS
  - LTE D2D rel. 14 1 PC for LTE-V2X (L2) and B.A.T.M.A.N (L2)
    - Connection to AETBN via ETH
  - LTE D2D rel.14
    - Mode 2: single radio front-end (SL)
    - Next Step: LTE V2X mode 3 & 4
  - GPSDO required for 10Mhz synch pulses
    - WLTB independent timing from AETBN
  - 700 MHz 10Mhz
    - Next step: 5.9Ghz with automotive-grade Power Amplifier



https://www.openairinterface.org/

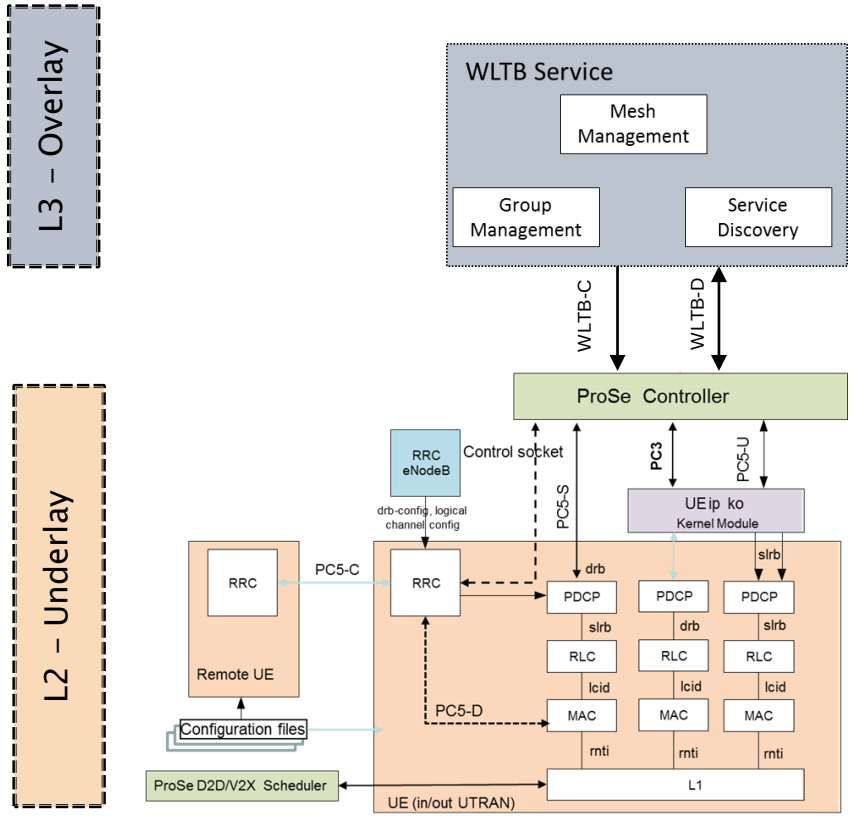


Prototyping of WLTB: TCMS Domain

- Overlay/Underlay approach
  - Underlay

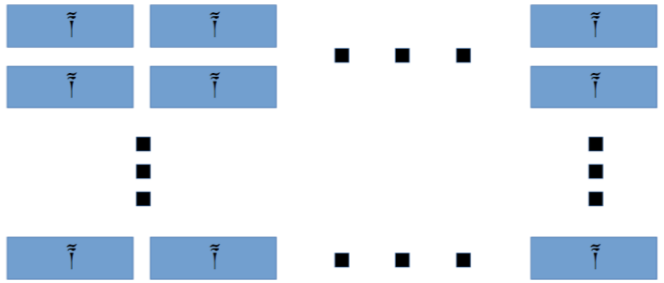
DEMO

    - OpenAirInterface (OAI) SDR platform
      - LTE V2X L2 functions (sidelink, broadcast)
      - ProSe Controller configured for L2 (MESH)
      - QoS: LTE RB as function of the ProSe PPP
  - Overlay
    - Service discovery – Consist-2-Consist Communication
    - Group communication – Consist Management
    - Mesh Management – multi-hop
    - Security

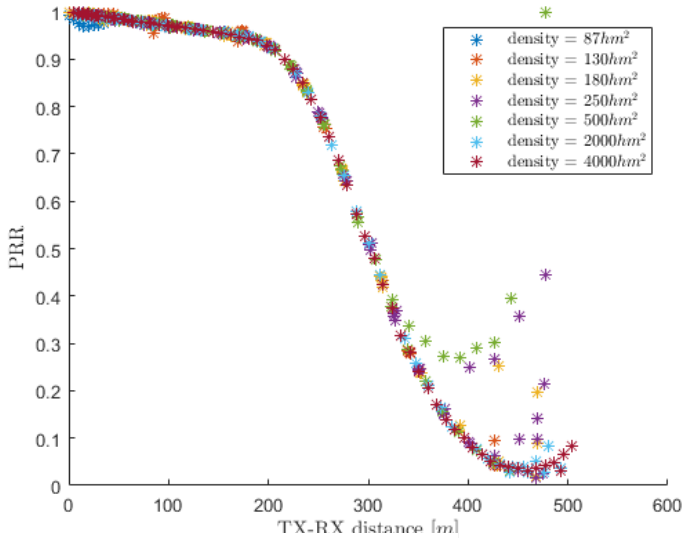


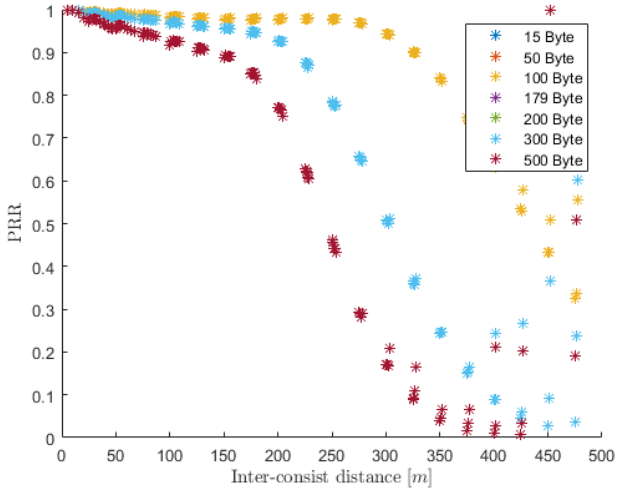
WLTB under challenging conditions

- Scenario: Large Depot
  - Simulator: ns-3 with LTE-V2X extension
  - Channel: Log Distance Fading



density $[veh/hm^2]$	inter-antenna distance $[m]$
87	444
130	74
180	37
250	25
500	17
2000	12
4000	9





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